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EXAMINER

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte TETSUNORI KAJI, SHINICHI TACHI, TORU OTSUBO,
KATSUYA WATANABE, KATSUHIKO MITANI and
JUNICHI TANAKA

Appeal 2009-003033
Application 10/808,559
Technology Center 1700

Decided: August 4, 2009

Before JEFFREY T. SMITH, MARK NAGUMO, and
MICHAEL P. COLAIANNI, *Administrative Patent Judges*.

SMITH, *Administrative Patent Judge*.

DECISION ON APPEAL

Statement of the Case

This is an appeal under 35 U.S.C. § 134 from a final rejection of claims 8-10, 12-25, and 27-38, all of the pending claims. We have jurisdiction under 35 U.S.C. § 6.¹

We AFFIRM

Appellants' invention relates to a plasma processing apparatus that comprises a plasma discharge confining means. According to Appellants, the plasma processing apparatus is useful for processing semiconductor wafers. (Br. 6). Claim 8 is illustrative:

8. A plasma processing apparatus comprising:
 - a vacuum processing chamber for processing a sample, including an insulator film, by using plasma;
 - an outer chamber surrounding the vacuum processing chamber connected with an evacuation means;
 - a gas supplying unit for introducing into the vacuum processing chamber a fluorine-containing processing gas;
 - an upper electrode and a lower electrode for generating plasma therebetween and providing the vacuum processing chamber;
 - an electrode cover made of silicon being provided at the outer surface of the upper electrode; and
 - a discharge confining means comprised of SiC for separating the vacuum processing chamber from the outer chamber and for increasing plasma density in the vacuum processing chamber.

¹ In this decision we have considered Appellants' arguments presented in the Appeal Brief, filed February 26, 2008.

The Examiner relies on the following references in rejecting the appealed claims:

Ohmi	5,272,417	Dec. 21, 1993
Steger	5,494,523	Feb. 27, 1996
Lenz (Lenz '751)	5,534,751	Jul. 9, 1996
Lenz (Lenz '356)	5,569,356	Oct. 29, 1996
Lenz (Lenz '720)	5,609,720	Mar. 11, 1997
Koshiishi	5,919,332	Jul. 6, 1999
Ogasawara	JP 7-135200	May 23, 1995

Appellants appeal the following rejections:

Claims 8, 13, 16, 19, 24, 25, 29, 33 and 35 stand rejected under 35 U.S.C. § 103(a) over the combination of Lenz '751, Ohmi, and Lenz '356.

Claims 9-12, 14-15, 17-18, 20-23, 30, 34 and 36 stand rejected under 35 U.S.C. § 103(a) over the combination of Lenz '751, Ohmi, Lenz '356, and Steger or Ogasawara.

Claims 27, 28, 31, 32, 37 and 38 stand rejected under 35 U.S.C. § 103(a) over the combination Lenz '751, Ohmi, Lenz '356, and Steger or Ogasawara and further in combination with Koshiishi and Lenz '720.

The rejection of claims 8, 13, 16, 19, 24, 25, 29, 33 and 35.

The Examiner found (Ans. 5-8) that the combination of Lenz '751, Ohmi and Lenz '356 would have rendered the claimed invention obvious. The Examiner found that Lenz '751 teaches the claim limitations regarding a discharge confining means separating a vacuum

chamber from an outer chamber for increasing plasma density in the vacuum processing chamber. The Examiner found that, although Lenz '751 fails to teach an electrode cover made of silicon, Ohmi teaches such an electrode cover. The Examiner also found that although Lenz '751 fails to teach a dielectric discharge confining means made of SiC, Lenz '356 teaches a dielectric discharge confining means 34 made of SiC as claimed by Appellants.

Appellants (App. Br. 19-21) argue that Lenz '751 is not capable of meeting the claimed function of a discharge confining means for increasing the plasma density within the vacuum processing chamber due to the circumferential slots (31) contained in the confinement ring assembly (30). Appellants (App. Br. 21-22) argue that Lenz '356 was filed before Lenz '751 therefore if SiC was suitable for the discharge confining means of, Lenz '751 it would have been disclosed as an alternative.

ISSUES

The issues presented for review are: Have Appellants shown that discharge confining means of Lenz '751 is not capable of meeting the claimed function of a discharge confining means for increasing the plasma density within the vacuum processing chamber; and Have Appellants shown reversible error in the Examiner's conclusion that it would have been obvious to a person of ordinary skill in the art to utilize SiC as the discharge confining means, of Lenz '751? We decide these issues in the negative.

PRINCIPLES OF LAW

Where the rejection is based on a combination of references, the test for obviousness is what the combined teachings of the references would have suggested to those of ordinary skill in the art. *In re Keller*, 642 F.2d 413, 425 (CCPA 1981). In assessing whether a claim to a combination of prior art elements would have been obvious, a further question to be asked is whether the improvement of the claim is more than the predictable use of prior art elements according to their established functions. *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398 (2007). The analysis need not seek out precise teachings directed to the specific subject matter of the claim, for it is proper to take account of the inferences and creative steps that a person of ordinary skill in the art would employ. *Id.* at 1740-1741.

FINDINGS OF FACT

The Examiner found that Lenz '751 discloses plasma processing apparatus that comprises a plasma discharge confining means (30) that is capable of increasing the plasma density within the vacuum processing chamber. (Ans. 5-6). Lenz '751 discloses the plasma discharge confining means (30) is formed from dielectric materials. (Lenz '751, col. 6, 16-19). The Examiner found that Lenz '751 failed to teach SiC as a discharge confining material. However, the Examiner found that Lenz '356 taught SiC was a dielectric material suitable for a discharge confining means. (Ans. 6; Lenz '356, col. 5, 54-64). The Examiner concluded that it would have been obvious to a person of

ordinary skill in the art to utilize SiC, a known material suitable for a discharge confining means, in a plasma processing apparatus. (Ans. 6).

ANALYSIS¹

Appellants have not stated that the Examiner's findings are in error. While Appellants allege that the confinement means of Lenz '751 is incapable of increasing plasma density within the vacuum processing chamber, Appellants have not provided further explanation in support thereof. Appellants have not directed us to evidence to support the argument that the circumferential slots (31), contained in the confinement ring assembly Lenz '751, renders the confining means incapable of meeting the claimed function of a discharge confining means. Appellants have not asserted that the required number of or dimensions of the confinement rings (32) and slots (31) would have rendered the confinement means (30) of Lenz '751 incapable of increasing the plasma density within the vacuum processing chamber (30). Appellants' arguments regarding the filing date of Lenz '356 do not address whether a person of ordinary skill at the time of the present invention would have recognized that SiC was suitable material for a discharge confining means of, Lenz '751. Moreover, Appellants have not argued that a confinement means formed from SiC would have been unsuitable for the stated purpose of Lenz '751.

¹ Appellants' do not present separate arguments for the rejected claims. (App. Br. 19-22). We select claim 8 as representative. Accordingly, we will limit our discussion to independent claim 8.

For the foregoing reasons and those presented in the Answer, we conclude that Appellants have failed to prove reversible error and we affirm the rejection of claims 8, 13, 16, 19, 24, 25, 29, 33 and 35 under 35 U.S.C. § 103(a) over the combination of Lenz '751 in view of Ohmi and Lenz '356.

The rejection of claims 9-12, 14-15, 17-18, 20-23, 30, 34 and 36.

Appellants do not dispute the Examiner's findings that Steger and Ogasawara both teach a susceptible cover comprised of silicon. Rather Appellants argue that "[e]ven if the reference to Lenz '751 were modified to include the susceptible covers of Steger and Ogasawara, the combination would still not include a discharge confinement means comprised of SiC to increase plasma density within a vacuum processing chamber." (App. Br. 23). These arguments are not persuasive for the reasons stated above.

The rejection of claims 27, 28, 31, 32, 37 and 38.

Appellants do not dispute the Examiner's findings that Koshiishi teaches the claimed plasma density or Lenz '720 teaches the diameter of the confinement means. Rather Appellants argue that "nothing in either Koshiishi or Lenz '720 overcomes the fundamental failings of the other references to meet the claim limitations concerning the discharge confining means comprised of SiC for increasing plasma density within

the vacuum processing chamber.” (App. Br. 23-24). These arguments are not persuasive for the reasons stated above.

ORDER

The rejections of claims 8-10, 12-25, and 27-38 under 35 U.S.C. § 103(a) are affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(v).

AFFIRMED

tc

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